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Math 362 Fourier Analysis

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Class Prep 9

Section 4.5.1

Key Concepts: A spectrogram of a signal is an image matrix whose columns are the Fourier transform coefficient magnitudes of over successive subintervals of [0, T]. Spectrograms are typically designed to display the spectrum of at essentially each moment of time over [0, T]. In this section we learn how to construct basic spectrograms and compute spectrograms using MATLAB.

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| Input Commands | Output Plots (If Applicable) |
| >> spectrum2sines(2,6)  D =  0.0000 0.0000  0.0000 0.0000  0.5000 0.0000  0.0000 0.0000  0.0000 0.0000  0.0000 0.0000  0.0000 0.5000  0.0000 0.0000  0.0000 0.0000 |  |
| >> spectrum2sines(6,2)  D =  0.0000 0.0000  0.0000 0.0000  0.0000 0.5000  0.0000 0.0000  0.0000 0.0000  0.0000 0.0000  0.5000 0.0000  0.0000 0.0000  0.0000 0.0000 |  |
| >> spectrum4cosines(0,1,2,3)  D =  1.0000 0.0000 0.0000 0.0000  0 0.5000 0.0000 0.0000  0 0.0000 0.5000 0.0000  0 0.0000 0.0000 0.5000  0 0.0000 0.0000 0.0000  0 0.0000 0.0000 0.0000 |  |
| >> spectrum4cosinemix(0,1,2,3)  D =  1.0000 0.0000 0.0000 0.0000  0.5000 0.5000 0.0000 0.0000  0.0000 0.5000 0.5000 0.0000  0.0000 0.0000 0.5000 0.5000  0.0000 0.0000 0.0000 0.0000  0.0000 0.0000 0.0000 0.0000 |  |

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| >> CommonWindows(32) |  |
| >> [z,sr]=audioread('FourierAnalysisIntro.wav');  >> SpectrogramPlot(z,sr,6000) |  |